We Claim:

1. A cuff for measuring physiological parameters of an appendage, comprising:

a hollow, rigid tube having an inner surface and opposed ends; and

a bladder having an inner surface, an outer surface, and opposed ends, the ends of the bladder being sealed to the ends of the tube to create an enclosed internal volume between the inner surface of the bladder and the inner surface of the tube and an external volume defined by the outer surface of the bladder and surrounded by the internal volume, the bladder having a normal, relaxed state, in which the internal volume is filled with a fluid and a retracted state in which the fluid is evacuated from the internal volume.

2. The cuff of claim 1, wherein the bladder is tubular in shape, and wherein the ends of the bladder overlap the ends of the tube.

3. The cuff of claim 2, wherein the thickness of the bladder is greater where the ends of the bladder overlap the ends of the tube.

4. The cuff of claim 2, wherein the bladder has a center portion between the ends and a transition region between the ends and the center portion, and wherein the thickness of the bladder is greater at the transition region.

5. The cuff of claim 1, further comprising a fluid port extending through the tube and communicating with the internal volume, through which the internal volume can be filled with or emptied of the fluid.

6. The cuff of claim 1, further comprising two stiffener ribs placed on the inner surface of the bladder, parallel to each other and parallel to the longitudinal axis of the tube at diametrically opposite positions.

7. The cuff of claim 1, wherein the bladder, in its normal, relaxed state, has an inside diameter smaller than the diameter of the smallest diameter of the type of appendage to be measured.

8. The cuff of claim 7, wherein the bladder is made of a material that allows the inside diameter to stretch at least to the diameter of the largest diameter of the type of appendage to be measured.

9. The cuff of claim 8, wherein the material is able to stretch approximately two to three times its original diameter and return back to its original diameter without deforming.

10. The cuff of claim 1, wherein the bladder is made from a material chosen from the group consisting of a thin wall rubber and a thin wall silicone rubber.

11. The cuff of claim 10, wherein the material has a thickness of between 0.012 inch and 0.016 inch, and has a high tear strength.

12. The cuff of claim 6, further comprising a plurality of emitters and detectors positioned in the enclosed internal volume.

13. The cuff of claim 12, wherein the emitters and detectors are embedded in one of the stiffener ribs.

14. The cuff of claim 1, further comprising:

a plurality of emitters and detectors positioned in the enclosed internal volume.

15. The cuff of claim 14, wherein the emitters and detectors are placed on the inner surface of the bladder, and the emitters and detectors respectively emit and detect light through the bladder.

16. The cuff of claim 15, further comprising a stiffener rib placed on the inner surface of the bladder, wherein the emitters and detectors are embedded in the stiffener rib.

17. The cuff of claim 14, wherein the emitters and detectors are positioned in a linear fashion parallel to the longitudinal axis of the tube.

18. The cuff of claim 17, wherein all of the emitters are side-by-side and all of the detectors are side-by-side.

19. The cuff of claim 14, wherein the bladder has a sufficient wall thickness and is made from a material tinted with pigments selected such that the bladder material will absorb the specific wavelengths of light emitted by the emitters to damp light piping but also allow for sufficient transmission of light through the cuff in the appendage .